

इंटरनेट

मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 11111 (1984): Leaded bronze powders [MTD 25: Powder Metallurgical Materials and Products]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE



Indian Standard

SPECIFICATION FOR
LEADED BRONZE POWDERS

UDC 669.355'6"4—492.2



© Copyright 1985

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Indian Standard

SPECIFICATION FOR LEADED BRONZE POWDERS

Powder Metallurgical Materials and Products Sectional
Committee, SMDC 30

Chairman

DR R. VIJAYARAGHAVAN

Members

SHRI V. G. DATE (*Alternate to*
Dr R. Vijayaraghavan)

SHRI S. L. N. ACHARYULU

SHRI N. MAITRA (*Alternate*)

SHRI S. BANERJEE

SHRI S. K. BASU

SHRI R. BANERJEE (*Alternate*)

DR R. D. BHARGAVA

SHRI ANOOP SAXENA (*Alternate*)

SHRI P. G. BHATT

SHRI B. G. BHATT (*Alternate*)

SHRI A. K. HAZRA

SHRI R. N. PAUL (*Alternate*)

SHRI A. M. BISWAS

SHRI K. L. BARUAI (*Alternate*)

SHRI A. K. DUTTA

SHRI N. T. GEORGE

SHRI ANUP CHANDRA (*Alternate*)

SHRI T. R. GUPTA

SHRI K. C. MITTAL (*Alternate*)

SHRI B. M. KATARIA

SHRI M. V. DESHPANDE (*Alternate*)

SHRI K. KESAVAN

SHRI K. PARTHASARATHY

SHRI R. NARAYANSWAMY (*Alternate*)

SHRI T. RAMASUBRAMANIAN

SHRI Y. H. RAUT (*Alternate*)

Representing

Bhabha Atomic Research Centre, Bombay

Research & Development Organization, Ministry
of Defence

Ministry of Defence, Ordnance Factory Board
Indian Oxygen Ltd, Calcutta

Assotex Engineering Industries Ltd, Bombay

Flexicons Ltd, Bombay

Ministry of Defence (DGI)

National Test House, Calcutta

Tata Engineering and Locomotive Co Ltd,
Jamshedpur
Powder Metallurgy Association of India,
Hyderabad

India Hard Metals Ltd, Calcutta

Mahindra Sintered Products Ltd, Pune

The Metal Powder Co Ltd, Thirumangalam
Ashok Leyland Ltd, Madras

Directorate General of Technical Development,
New Delhi

(*Continued on page 2*)

© Copyright 1985

INDIAN STANDARDS INSTITUTION

This publication is protected under the *Indian Copyright Act* (XIV of 1957) and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act.

(Continued from page 1)

Members

DR M. NAGESWARA RAO

SHRI S. N. JHA (*Alternate*)

DR P. R. KRISHNAMURTHY

DR N. R. SANJANA

DR R. M. PARDESHI (*Alternate*)

SHRI ANIL R. SHAH

SHRI B. H. SHETTY (*Alternate*)

SHRI M. J. SHAHANI

SHRI J. P. TIWARI (*Alternate*)

SHRI R. SRINIVASAN

SHRI P. V. VASUDEVA RAO (*Alternate*)

SHRI R. SRINIVASAN

SHRI K. SADANAND (*Alternate*)

SHRI K. RAGHAVENDRAN,

Director (Struc & Met)

Representing

Mishra Dhatu Nigam Ltd, Hyderabad

Bharat Heavy Electricals Ltd, Hyderabad

Sandvik Asia Ltd, Pune

Khosla Metal Powders Pvt Ltd, Pune

National Metallurgical Laboratory, Jamshedpur

Central Electrochemical Research Institute,
Karaikudi

Widra (India) Ltd, Bangalore

Director General, ISI (*Ex-officio Member*)

Secretary

SHRI JAGMOHAN SINGH

Deputy Director (Metals), ISI

Indian Standard

SPECIFICATION FOR LEADED BRONZE POWDERS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 21 February 1984, after the draft finalized by the Powder Metallurgical Materials and Products Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 Leaded bronze alloy powder is used for the manufacture of steel backed metal powder bearings and bushings made by combination of sintering and rolling processes.

0.3 This standard contains clauses **6.1** and **9.1** which call for agreement between the purchaser and the manufacturer.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the requirements for leaded bronze alloy powder for use in the manufacture of bimetallic bearings and bushes.

2. TERMINOLOGY

2.1 For the purpose of this standard, definitions given in IS : 5432-1982† shall apply.

3. SUPPLY OF MATERIAL

3.1 General requirements relating to the supply of leaded bronze powder shall be as laid down in IS : 1387-1967‡.

*Rules for rounding off numerical values (*revised*).

†Glossary of terms relating to powder metallurgy (*first revision*).

‡General requirements for the supply of metallurgical material (*first revision*).

4. MANUFACTURE

4.1 Powder may be manufactured by atomization or any other method.

5. CHEMICAL COMPOSITION

5.1 The chemical composition of the material shall be as given below:

	<i>Mass, Percent</i>
Lead	8 to 11
Tin	9 to 11
Phosphorous	0.25 <i>Max</i>
Nickel	0.1 <i>Max</i>
Iron	0.1 <i>Max</i>
Antimony	0.3 <i>Max</i>
Total others	0.1 <i>Max</i>
Hydrogen loss	0.75 <i>Max</i>
Acid insoluble	0.2 <i>Max</i>
Copper	Remainder

5.1.1 Lead, tin, phosphorous, nickel, iron, antimony and copper content shall be determined in accordance with IS : 4027-1967*.

5.1.2 The hydrogen loss shall be determined as per the procedure given in IS : 5644-1981† by reducing the sample at $600 \pm 10^{\circ}\text{C}$ for 10 minutes in a current of hydrogen.

6. SIEVE ANALYSIS

6.1 The sieve analysis of material shall be as agreed to between the purchaser and the manufacturer.

7. PHYSICAL PROPERTIES

7.1 Apparent Density — The apparent density of the powder when tested in accordance with IS : 4848-1981‡ shall be between 4.0 and 6.0 g/cm³.

*Methods of chemical analysis of bronzes.

†Methods for determination of hydrogen loss of copper, tungsten and iron powders (*first revision*).

‡Methods for determination of apparent density of powder for powder metallurgical purposes (*first revision*).

7.2 Flow Rate — The flow rate of powder shall be tested in accordance with IS : 4840-1984*. The time taken for 50 g of the powder to flow through the orifice shall be less than 25 seconds.

8. SAMPLING

8.1 The sampling of powders for conducting various tests shall be done in accordance with IS : 6492-1972†.

9. PACKING

9.1 The material shall be supplied packed in suitable containers in quantities mutually agreed to between the purchaser and the manufacturer.

10. MARKING

10.1 Each container of powder shall be suitably marked with the following information:

- a) Content with process of manufacture (for example, atomized leaded bronze powder),
- b) Manufacturer's name,
- c) Batch number and date of manufacture, and
- d) Net mass of contents.

10.1.1 The container may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

*Methods for determination of flow rate of powders for powder metallurgical purposes (*first revision*).

†Methods for sampling of powders for powder metallurgical purposes.

INDIAN STANDARDS

ON

POWDER METALLURGICAL MATERIALS AND PRODUCTS

IS:

a) Method of Tests

- 4840-1984 Method for determination of flow rate of powders for powder metallurgical purposes (*first revision*)
- 4841-1982 Method for determination of density of sintered metallic materials (*first revision*)
- 4842-1982 Method for transverse testing of hard metals (*first revision*)
- 4848-1981 Method for determination of apparent density of powders for powder metallurgical purposes (*first revision*)
- 4857-1982 Method for determination of compressibility of ductile metal powders (*first revision*)
- 5461-1984 Method for sieve analysis of metal powders (*first revision*)
- 5642-1982 Method for determination of wet density and interlocking porosity of sintered powder metal structural parts and porous bearings (*first revision*)
- 5644-1981 Method for determination of hydrogen loss of copper tungsten and iron powders (*first revision*)
- 5652-1981 Method for Rockwell (A scale) hardness test for hard metals (*first revision*)
- 6492-1972 Method for sampling of powder for powder metallurgical purposes
- 7438-1974 Method of test for acid-insoluble content of copper and iron powders
- 7512-1974 Method for the determination of average particle size of metal powders by fisher subsieve sizer
- 8871-1978 Method for determination of tap density of metallic powders
- 8876-1978 Method for the determination of residue on chlorination of tungsten metal powders
- 10385-1982 Determination of radial crushing strength of sintered metal powder bearings
- 10441-1982 Determination of apparent density of non-free flowing powders

b) Specifications

- 7505-1974 Cobalt powder
- 7506-1974 Nickel powder
- 8367-1977 Metallic tin powder
- 8368-1977 Tungsten carbide powder
- 8369-1977 Titanium carbide powder
- 8370-1977 Iron powders for powder metallurgical applications
- 8392-1977 Tungsten powder
- 8484-1977 Metal powders for welding electrodes
- 8485-1977 Copper powder for powder metallurgical applications
- 10035-1981 Bronze powder for metallic filter applications
- 11110-1984 Copper lead powder
- 11111-1984 Leaded bronze powder

c) Miscellaneous

- 5432-1982 Glossary of terms relating to powder metallurgy (*first revision*)